

CLAIMS

What is claimed is:

1 1. An article comprising:
2 a first die disposed upon a mounting substrate, wherein the first die
3 includes a first die active first surface and a first die backside second
4 surface; and

5 a molding compound cap abutting the first die and including a third
6 surface that originates substantially above the first die active first surface
7 and below the first die backside second surface.

1 2. The article according to claim 1, wherein the third surface that
2 originates substantially above the first die active first surface includes:
3 a meniscus that originates substantially above the first die active first
4 surface; and
5 a substantially planar surface that is selected from parallel planar to
6 the first die active first surface, and located above the first die active first
7 surface at a height that is a fraction of the die height.

1 3. The article according to claim 1, wherein the third surface that
2 originates substantially above the first die active first surface, includes:
3 a meniscus that originates substantially above the first die active first
4 surface, and
5 wherein the meniscus is selected from a capillary action meniscus and an
6 imposed meniscus.

1 4. The article according to claim 1, wherein the third surface that
2 originates substantially above the first die active first surface includes:

3 a meniscus that originates substantially above the first die active first
4 surface; and

5 a substantially planar surface that is coplanar to the first die active
6 first surface.

1 5. The article according to claim 1, further including a second die
2 disposed upon the mounting substrate, wherein the second die includes a second die
3 active first surface and a second die backside second surface, and wherein the
4 molding compound cap abuts the second die.

1 6. The article according to claim 1, further including a second die
2 disposed upon the mounting substrate, wherein the second die includes a second die
3 active first surface and a second die backside second surface, wherein the molding
4 compound cap abuts the second die, and wherein the molding compound exposes an
5 upper surface of the mounting substrate between the first die and the second die.

1 7. The article according to claim 1, further including a second die
2 disposed upon the mounting substrate, wherein the second die includes a second die
3 active first surface and a second die backside second surface, wherein the molding
4 compound cap abuts the second die, and wherein the molding compound includes a
5 curvilinear profile between the first die and the second die.

1 8. The article according to claim 1, further including:
2 a second die disposed upon the mounting substrate, wherein the
3 second die includes a second die active first surface and a second die
4 backside second surface, wherein the molding compound cap abuts the
5 second die; and
6 a last die disposed upon the mounting substrate, wherein the last die
7 includes a last die active first surface and a last die backside second surface,
8 wherein the molding compound cap abuts the last die.

- 1 9. The article according to claim 1, further including:
- 2 a second die disposed upon the mounting substrate, wherein the
3 second die includes a second die active first surface and a second die
4 backside second surface, wherein the molding compound cap abuts the
5 second die;
- 6 a last die disposed upon the mounting substrate, wherein the last die
7 includes a last die active first surface and a last die backside second surface,
8 wherein the molding compound cap abuts the last die; and
- 9 wherein the first die, the second die, and the last die are arranged in a
10 configuration selected from:
- 11 the first die, the second die, and the last die are disposed in a
12 single molding compound cap structure;
- 13 the first die, the second die, and the last die are each disposed
14 in separate molding compound cap structures;
- 15 the first die and the second die are disposed in a single
16 molding compound cap structure, and at least two occurrences of the
17 last die are disposed in a single molding compound cap structure; and
- 18 the first die and the second die are each disposed in separate
19 molding compound cap structures, and at least two occurrences of
20 the last die are disposed in a single molding compound cap structure.
- 1 10. A package comprising:
- 2 a first die disposed upon a mounting substrate, wherein the first die
3 includes a first die active first surface and a first die backside second
4 surface;
- 5 a molding compound cap abutting the first die and including a third
6 surface that originates substantially above the first die active first surface
7 and below the first die backside second surface; and
- 8 a heat spreader bonded to the first die backside second surface.

- 1 11. The package according to claim 10, further including:
2 a heat sink in thermal contact with the heat spreader.
- 1 12. The package according to claim 10, wherein the third surface that
2 originates substantially above the first die active first surface, includes:
3 a meniscus that originates substantially above the first die active first
4 surface; and
5 a substantially planar surface that is selected from parallel planar to
6 the first die active first surface, and located above the first die active first
7 surface at a height that is a fraction of the die height.
- 1 13. The package according to claim 10, further including:
2 a second die disposed upon the mounting substrate, wherein the
3 second die includes a second die active first surface and a second die
4 backside second surface, wherein the molding compound cap abuts the
5 second die; and
6 a last die disposed upon the mounting substrate, wherein the last die
7 includes a last die active first surface and a last die backside second surface,
8 wherein the molding compound cap abuts the last die.
- 1 14. A computing system comprising:
2 a first die disposed upon a mounting substrate, wherein the first die
3 includes a first die active first surface and a first die backside second
4 surface; and
5 a molding compound cap abutting the first die and including a third
6 surface that originates substantially above the first die active first surface
7 and below the first die backside second surface; and
8 at least one of an input device and an output device coupled to the
9 first die.

1 15. The computing system according to claim 14, wherein the computing
2 system is disposed in one of a computer, a wireless communicator, a hand-held
3 device, an automobile, a locomotive, an aircraft, a watercraft, and a spacecraft.

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2 16. The computing system according to claim 14, wherein the
3 microelectronic die is selected from a data storage device, a digital signal processor,
4 a micro controller, an application specific integrated circuit, and a microprocessor.

1 17. The computing system according to claim 14, wherein the third
2 surface that originates substantially above the first die active first surface includes:
3 a meniscus that originates substantially above the first die active first
4 surface; and

5 a substantially planar surface that is selected from parallel planar to
6 the first die active first surface, and located above the first die active first
7 surface at a height that is a fraction of the die height.

1 18. The computing system according to claim 14, further including:
2 a second die disposed upon the mounting substrate, wherein the
3 second die includes a second die active first surface and a second die
4 backside second surface, wherein the molding compound cap abuts the
5 second die; and

6 a last die disposed upon the mounting substrate, wherein the last die
7 includes a last die active first surface and a last die backside second surface,
8 wherein the molding compound cap abuts the last die.

1 19. The computing system according to claim 14, further including:
2 a second die disposed upon the mounting substrate, wherein the
3 second die includes a second die active first surface and a second die
4 backside second surface, wherein the molding compound cap abuts the
5 second die; and

6 a last die disposed upon the mounting substrate, wherein the last die
7 includes a last die active first surface and a last die backside second surface,
8 wherein the molding compound cap abuts the last die.

1 20. A processing system comprising:
2 a mold chase including a profile that is capable of causing molding
3 cap compound to originate on a die at a die height that is substantially above
4 the die active surface and below the die backside surface.

1 21. The processing system according to claim 20, wherein the profile is
2 capable of forming a meniscus where the molding cap compound originates,
3 wherein the meniscus is formed as one selected from a capillary action meniscus
4 and an imposed meniscus.

1 22. The processing system according to claim 20, wherein the profile is
2 capable of imposing an exposed upper surface upon a mounting substrate at a
3 position between a first die cavity in the mold chase and a second die cavity in the
4 mold chase.

1 23. The processing system according to claim 20, wherein the profile
2 includes a first die cavity, a second die cavity contiguous the first die cavity, and a
3 last die cavity contiguous the first die cavity,
4 wherein the first die cavity, the second die cavity, and the last die
5 cavity are arranged in a configuration selected from:

6 the first die cavity, the second die cavity, and the last die
7 cavity are disposed in a single molding compound cap cavity;
8 the first die cavity, the second die cavity, and the last die
9 cavity are each disposed in separate molding compound cap cavities;
10 the first die cavity and the second die cavity are disposed in a
11 single molding compound cap cavity, and at least two occurrences of

12 the last die cavity are disposed in a single molding compound cap
13 cavity; and
14 the first die cavity and the second die cavity are each
15 disposed in separate molding compound cap cavities, and at least two
16 occurrences of the last die are disposed in a single molding
17 compound cap cavity.

1 24. A process comprising:
2 forming a molding compound cap over a first die that is disposed
3 upon a substrate, wherein the first die includes a first die active first surface
4 and a first die backside second surface, and wherein forming the molding
5 compound cap includes forming a molding compound cap third surface that
6 is above the first die active first surface and below the first die backside
7 second surface.

1 25. The process according to claim 24, wherein forming a molding
2 compound cap third surface includes forming the meniscus selected from a capillary
3 action meniscus and an imposed meniscus.

1 26. The process according to claim 24, further including:
2 forming the molding compound cap over a second die that is
3 disposed upon the mounting substrate, wherein the second die includes a
4 second die active first surface and a second die backside second surface, and
5 wherein forming the molding compound cap includes forming the molding
6 compound cap third surface above the second die active first surface and
7 below the second die backside second surface.

1 27. The process according to claim 24, further including:
2 forming the molding compound cap over a last die that is disposed
3 upon the mounting substrate, wherein the last die includes a last die active

4 first surface and a last die backside second surface, and wherein forming the
5 molding compound cap includes forming the molding compound cap third
6 surface above the last die active first surface and below the last die backside
7 second surface.

1 28. The process according to claim 24, wherein forming the molding
2 compound cap includes injection molding the molding compound with a particulate.

1 29. The process according to claim 24, further including:
2 forming the molding compound cap over a second die that is
3 disposed upon the mounting substrate, wherein the second die includes a
4 second die active first surface and a second die backside second surface, and
5 wherein forming the molding compound cap includes forming the molding
6 compound cap third surface above the second die active first surface and
7 below the second die backside second surface; and

8 forming the molding compound cap over a last die that is disposed
9 upon the mounting substrate, wherein the last die includes a last die active
10 first surface and a last die backside second surface, and wherein forming the
11 molding compound cap includes forming the molding compound cap third
12 surface above the last die active first surface and below the last die backside
13 second surface.

1 30. The process according to claim 24, wherein forming the molding
2 compound cap is selected from injection molding, *in situ* thermal curing, pick-and-
3 place coupling the molding compound cap with the first die, and combinations
4 thereof.